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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,926	09/30/2003	Claus Michael Olsen	YOR920030005	5166

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EXAMINER
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BRADLEY, MATTHEW A

ART UNIT	PAPER NUMBER
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2187

DATE MAILED: 10/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/674,926	<b>Applicant(s)</b> OLSEN ET AL.	
	<b>Examiner</b> Matthew Bradley	<b>Art Unit</b> 2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Preliminary Amendment*

The Preliminary Amendment filed March 18, 2004 has been entered and the amended claims are hereto being used for examination.

Claims 1-19 have been examined.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 rejected under 35 U.S.C. 102(b) as being anticipated by Ryu (U.S. 5,898,880).

As per independent claim 1, Ryu teaches,

- first and second of levels of a storage hierarchy, (Column 4 lines 38-45).

*The Examiner notes that the first and second levels of a storage hierarchy that are claimed instantly are taught by Ryu as the physical hard disk drive and the cache of the hard disk drive respectively.*

- wherein accessing information in the first level consumes more energy than accessing information in the second level; (Column 4 lines 3-45).

*The Examiner notes that as taught in the Background of the Invention of Ryu, accessing information in the first level (the physical hard disk drive) consumes more energy then accessing just the cache due in part to the*

*required operation of the hard disk drive motor. Accordingly, accessing information in the first level consumes more energy than accessing information in the second level.*

- o and a processor for writing information to the second level of storage based on energy-conserving criteria. (Column 4 lines 46-52)

As per dependent claim 2, Ryu teaches, wherein the energy-conserving criteria comprise a collection of heuristics (Column 5 lines 40-43). *The Examiner notes that the system of Ryu teaches that the CPU carries out a control program routine responsive to the level of the battery signal. Accordingly, since multiple levels of a battery signal are possible, a collection of heuristics as claimed instantly is taught by Ryu with the collection of control program routines.*

As per dependent claim 3, Ryu teaches, wherein the energy-conserving criteria comprise system state information (Column 5 lines 40-43). *The Examiner notes that the battery level is respective of the current state of the system.*

As per dependent claim 4, Ryu teaches, wherein the system comprises a storage input/output subsystem and system state information comprises whether the storage input/output subsystem is using one or more specific files (Column 5 lines 40-43) *The Examiner notes that as discussed supra, multiple control program routines exist based on the battery level signal. Therefore, the storage input/output subsystem is using one of the control program routines.*

As per dependent claim 5, Ryu teaches, wherein the system state information comprises at least one factor from among the following factors: the storage input/output

associated with one or more predetermined software applications; a sequence of storage input/output operations; observed interactions with the first level of the storage hierarchy and wherein the collection of heuristics infer the state of the second level of the storage hierarchy; and a type of energy source powering the system (Column 5 lines 40-43).

As per dependent claim 6, Ryu teaches, further comprising a power source for the system and wherein the system state information comprises information identifying the amount of energy left in the power source when the system is disconnected from other sources of energy (Column 5 lines 10-17).

As per dependent claim 9, Ryu teaches, wherein the system state information comprises at least one factor from among the following factors: the storage input/output data associated with the characteristics of the connection between the first and second levels of the storage hierarchy; the storage input/output data associated with characteristics of the connection between the system and at least one second level of the storage hierarchy; the proximity of the storage input/output to events that change the state of the at least one first level of the storage hierarchy; the proximity of the storage input/output to a previous interaction with at least one first level of storage hierarchy; an indication of a hard-disk drive spin-down event; and physical characteristics of the second levels of the storage hierarchy (Column 6 lines 15-24).

As per dependent claim 10, Ryu teaches, wherein the system state information comprises physical characteristics of the second levels of the storage hierarchy (Column 6 lines 15-20). *The Examiner notes that the status of the hard disk cache as*

*taught by Ryu is a characteristic of the second level of the storage hierarchy as claimed instantly.*

As per dependent claim 12, Ryu teaches, wherein the system state information comprises the number of remaining write cycles (Column 5 lines 40-43).

As per dependent claim 13, Ryu teaches, wherein the processor is for removing information from the second level of storage based on energy-conserving criteria (Column 6 lines 32-38).

As per dependent claim 14, Ryu teaches, wherein writing information to the second level of storage further comprises: a mapping schema between cache files in the second level of storage and disk files in the first level of storage, wherein each cache file is named with a logical cluster number of its corresponding disk file (Column 6 lines 28-33).

As per dependent claim 15, Ryu teaches,

- comprising a hard disk drive comprising rotating magnetic media comprising the first level storage and (Column 4 lines 26-30)
- a cache comprising the second level storage and (Column 4 line 26-30)
- an application-specific integrated circuit for managing the cache according to the energy-conserving criteria. (Column 4 lines 26-30). *The Examiner notes that Ryu teaches of an apparatus that allows for energy conservation based on the physical hard disk drive and its cache.*

As per independent claim 16, Ryu teaches,

- first level storage for storing information; second level storage for storing information according to a set of energy-saving criteria; (Column 4 lines 38-45) *The Examiner notes that the first and second levels of a storage hierarchy that are claimed instantly are taught by Ryu as the physical hard disk drive and the cache of the hard disk drive respectively.*
- a battery level detector for determining the level of charge in a battery; (Column 5 lines 10-17).
- and a controller for writing information to the second level of storage when the battery level detector determines that the battery charge is below a pre-determined threshold of charge. (Column 4 lines 46-52)

As per independent claim 17, Ryu teaches,

- two levels of storage wherein a first level is managed and a second level is unmanaged wherein storing information in managed storage consumes less system resources than storing information in unmanaged storage, the method comprising: (Column 4 lines 38-45).
- monitoring the system to determine whether the operating state of the system satisfies one or more energy-conserving criteria; (Column 5 lines 10-17).
- and storing information in managed storage when the operating state of the system satisfies one or more energy-conserving criteria. (Column 4 lines 46-52)

As per independent claim 18, Ryu teaches,

- a computer readable medium comprising program instructions for:  
(Column 5 lines 61-62). *The Examiner notes that the instructions programmed onto the ROM of Ryu are program instructions. The computer reads the instructions on the ROM, thus the ROM is satisfying as a computer readable medium.*
- monitoring a system to determine whether the operating state of the system satisfies one or more energy-conserving criteria; and storing information in managed storage when the operating state of the system satisfies one or more energy-conserving criteria. (Column 4 lines 46-52)

As per independent claim 19, Ryu teaches,

- first and second levels of storage, (Column 4 lines 38-45). *The Examiner notes that the first and second levels of a storage hierarchy that are claimed instantly are taught by Ryu as the physical hard disk drive and the cache of the hard disk drive respectively.*
- wherein accessing the first level of storage uses more energy than accessing the second level of storage; (Column 4 lines 3-45). *The Examiner notes that as taught in the Background of the Invention of Ryu, accessing information in the first level (the physical hard disk drive) consumes more energy than accessing just the cache due in part to the required operation of the hard disk drive motor. Accordingly, accessing information in the first level consumes more energy than accessing information in the second level.*



- an energy use detector for determining the level of energy being used by the system; and an arbiter for writing information to second level storage when the energy use detector determines that the system is being powered by a battery. (Column 6 lines 20-24).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being obvious over Ryu (U.S. 5,898,880) in view of Thelander et al. (U.S. 2003/0009705).

As per dependent claim 7, Ryu teaches the limitations of dependent claim 3 and independent claim 1 for which dependent claim 7 depends upon.

Ryu is silent however on "the system stores current user profiles and the system state information comprises whether storage input/output data are associated with a current user profile."

Thelander et al teach, "the system stores current user profiles and the system state information comprises whether storage input/output data are associated with a current user profile" (Paragraph 48).

Ryu and Thelander et al are analogous art because they are from the same field of endeavor of power management in computing systems.

It would have been obvious to a person of ordinary skill in the art, having both the teachings of Ryu and Thelander et al before him/her, to implement the power saving method of Ryu into the power management profiles of Thelander et al to prevent loss of data.

The motivation for doing so would have been to have a, "power saving apparatus for hard disk drive, which enables disk cache to operate in a write back mode, so that it restricts hard disk access as much as possible, without having lost of data in the cache when a sudden system power off has occurred" (Column 4 lines 38-45 of Ryu).

Therefore it would have been obvious to combine Ryu with Thelander et al for the benefit of no lost data in the event of a sudden system power off to obtain the invention as specified in claims 7 and 8.

As per dependent claim 8, Thelander et al teach, wherein the system stores current user preferences and the system state information comprises whether storage input/output data are associated with current user preferences (Paragraph 48).

Claim 11 is rejected under 35 U.S.C. 103(a) as being obvious over Ryu (U.S. 5,898,880) in view of Applicants' admitted prior art.

As per dependent claim 11, Ryu teaches the limitations of independent claim 1 for which dependent claim 11 depends upon.

Ryu is silent however on the use of Flash memory for the second levels of storage hierarchy.

In the Applicants' disclosure, under Background of the Invention, in paragraph 5 on page 2, the Applicants' disclose, "data that are stored on an HDD can also be temporarily stored in other media with faster read or write time to improve access performance. These media could be alternate non-volatile memory such as Flash memory ..."

Both Ryu and the claimed instant invention are analogous art because they are from the same field of endeavor of reducing power consumption within hard disk drives.

It would have been obvious to a person of ordinary skill in the art, having both the teachings of Ryu and the Applicants' disclosure before him/her, to use Flash memory in Ryu as a form of secondary storage.

The motivation for doing so would have been, that Flash memory has a "faster read or write time" (Applicants' disclosure page 2, paragraph 5).

Therefore it would have been obvious to combine Ryu with the Applicants' disclosure for the benefit of Flash memory as a form of secondary storage to obtain the invention specified in claim 11.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1. U.S. Patent No. 5,937,433 Lee et al teach a method of controlling hard disk cache to reduce power consumption.
2. U.S. Patent Application Publication No. 2004/0010671 Sampsa et al. teach a method and memory adapter for handling data of a mobile device using a non-volatile memory.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Bradley whose telephone number is (571) 272-8575. The examiner can normally be reached on 6:30-3:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald A. Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CPC/mb



**CHRISTIAN CHACE  
PRIMARY EXAMINER**